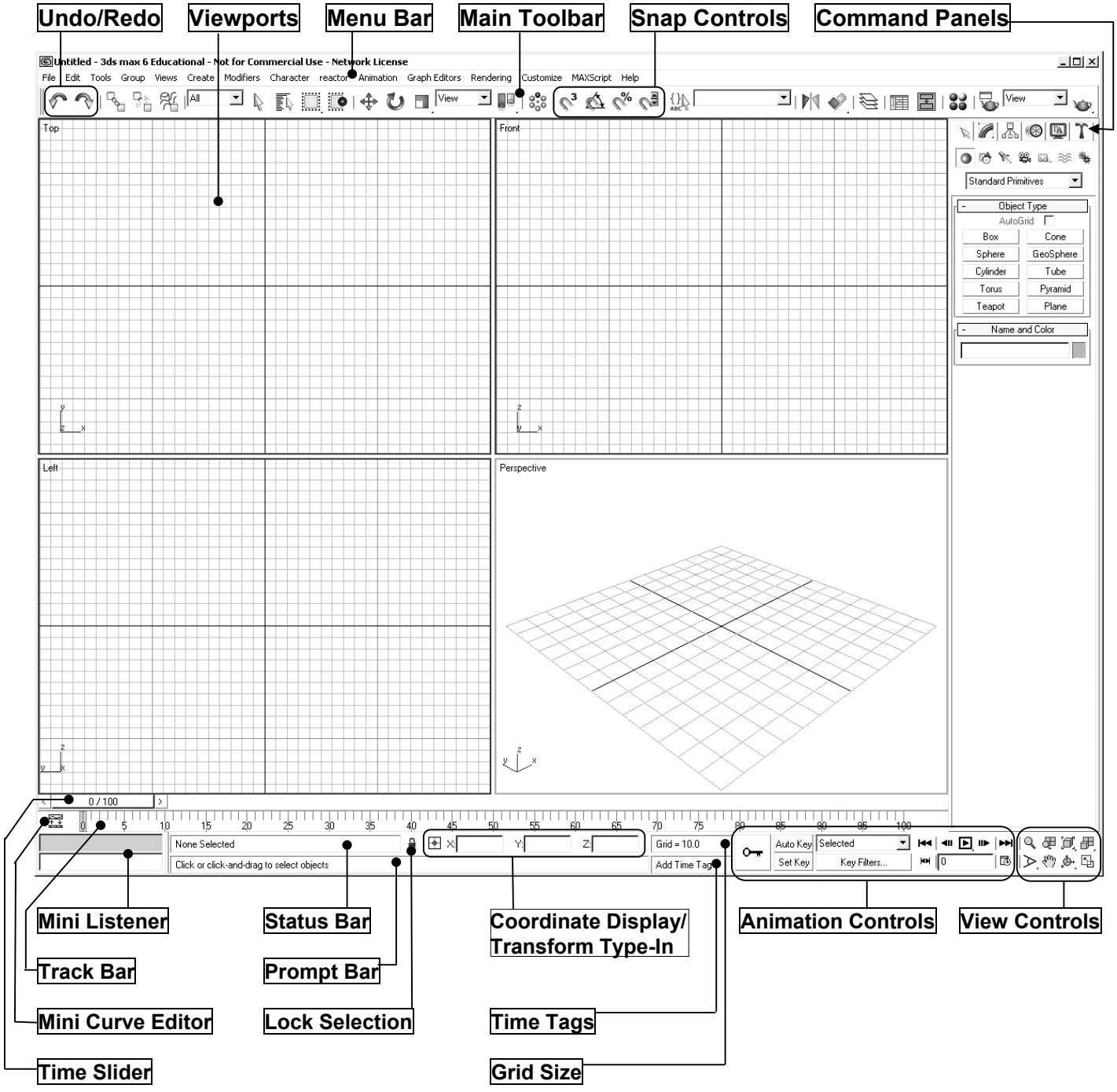
An Introduction to 3D Animation

Introducing 3ds max

The Main Screen and the Main Control Groups



Malcolm Wilson

Welcome to the course

Over the last fifteen years computers have become important tools for 3D animation. The main areas are special effects for film and television and computer games. Three programs lead the work in this field; 3ds max from Autodesk/discreet, Maya from Alias, and XSI from Softimage.

This course focuses on max and is based around a series of tutorial tasks and mini projects. Evidence of your work in the form of printouts and written assignments will be needed along with completed Log Books, recording your progress. For more details, see the Log Books. The tutorials assume that you have not worked with max before and will teach you how to operate the software. We'll be using a wide range of functions in max, covering the three main areas of Modelling, Rendering and Animation.

Conventions

As you might expect, mouse actions are referred to as **click**, **drag** and **double click**. These all use the left mouse button. **Right click** uses, would you believe, the right-hand mouse button, but only use this when instructed to do so, as the results are usually quite different.
Keyboard Shortcuts requiring two or more keys to be pressed together are shown as the sum of the keys in question, e.g. **Alt + F** means that you hold down the **Alt** key while you press the **F** key.

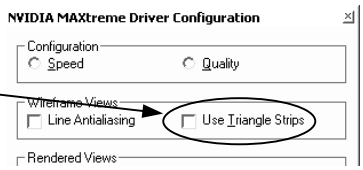
Logon Procedures

Your tutor will tell you how to log onto the computer, how to start up max and, most importantly, where you should store your files. Get into the habit of remembering where your files are stored and back them up at least once a month….So, start up max.

Getting Started

If you are running max for the very first time on a computer which has an NVIDIA graphics card installed, max may ask you to open the NVIDIA MAXtreme Driver Configuration dialogue box.

- Just **click** "Yes"
- In the next Panel, in the Wireframe Views section at the top, un-tick "Use Triangle Strips" followed by "Close".



MAXtreme is a special graphics card driver designed to work with max and certain NVIDIA cards.

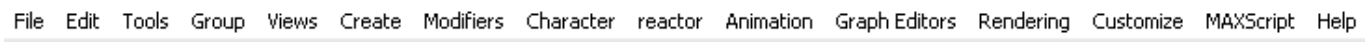
I have deliberately changed the max colour scheme to prepare these tutorials. The real program in front of you will be coloured differently, but the controls will be the same. In the following tutorials, you will find more details on the various functions and buttons on the screen. For now,

- Read the following notes and locate the items on the screen,
- Move the cursor over the buttons and read the Tool Tips,
- Try out functions as instructed.
- Complete the task at the end of this introduction

Windows Bar

Right at the top of the screen is the Windows bar, which shows you (as if you needed telling) which program you are running and the file you are working on. Initially this file is "Untitled". Incidentally, there are no differences between the Educational and Commercial versions of max.

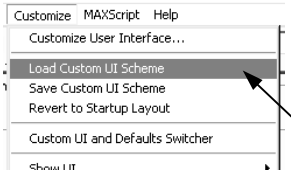
Main Menu



Under the Windows Bar is the max menu. The normal Windows conventions apply here; if you want to open a menu either **click** on the word or press **Alt + the underlined letter in the menu name**.
To close a menu without selecting, **click** on the menu name again. (You can simply **click** off to one side of the opened menu but you may inadvertently select or deselect something else)

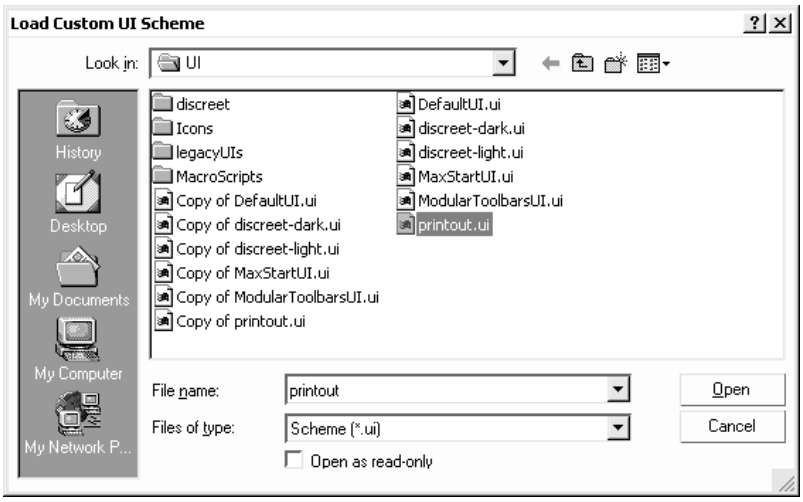
Changing the User Interface

Part of the assessment of this course requires you to produce written assignments discussing the relative merits of different tools and techniques. Obviously, being able to include screen-shots of max helps a great deal.



Max's dark grey colour scheme doesn't print out well however and needs changing so that captured screenshots are clearer.

- Click on the Customize Menu and select Load Custom UI Scheme as shown



Notice that there are a number of ready-made User Interfaces.

IMPORTANT MaxStartUI.ui is loaded on start-up. If you start up max and find that someone has changed the interface, come to this dialogue, load up Copy of MaxStartUI.ui and save this over the top of the corrupted MaxStartUI.ui

<u>This is the quickest way to get you up and running again with these tutorials.</u>

- For now, load up the printout.ui scheme as shown

Yes, I know it's a bit bright. (The Log Book has more information on how to capture screenshots.)

- Click on the Customize Menu again and select Load Custom UI Scheme
- This time, select Copy of MaxStartUI.ui and **click** on Open

The screen will revert to the normal grey colour scheme.

Main Toolbar

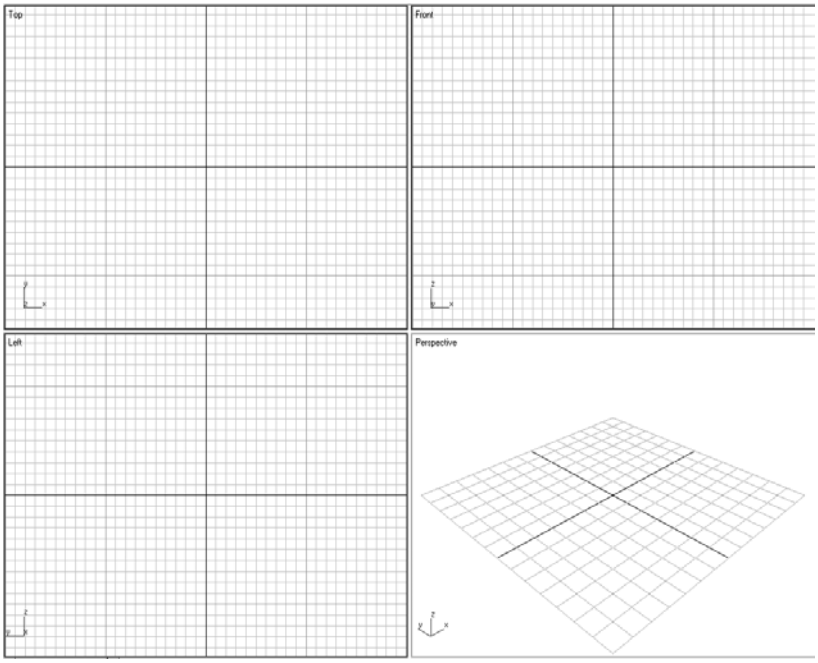
As usual, toolbars simply provide a single location for functions which can be found elsewhere. Functions on the Main Toolbar are also available through the Menus. If your are running max on a screen with a horizontal resolution of roughly less than 1200 pixels, you won't see all of the Main Toolbar anyway. Obviously, as with any Windows program, you can move the toolbars around, but you lose working screen area.

To scroll the toolbar on a <u>small</u> screen:

- Move the cursor over the toolbar and when the pointer changes into a hand, **drag** horizontally to move the buttons.

Viewports

Below the toolbars and occupying the most screen area are the Viewports. These are the windows into the 3D space and by default, max displays four equally sized viewports. Notice that each Viewport has a name and that three of these are "orthographic".



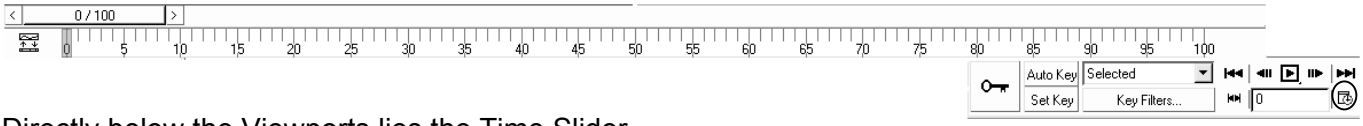
Thankfully, however, max doesn't name these as "Plan" or "Side Elevation" etc., but uses the much simpler terms of "Top", "Front" and "Left".
Only one viewport can be "active" at any time. This is shown by the yellow border.

- Click on another viewport to make it active.

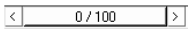
Notice that you can **right** or **left-click** to activate a viewport. (Right clicking is the better method, but Right clicking a second time will bring up a menu – which we will worry about later – just click off it to remove).
Notice also that each viewport has a grid, but that these grids do not necessarily appear in another viewport. For example, the grid seen in the Front view does not appear in the Perspective view, but the Top grid does.

Each viewport has a small x,y,z axes "tripod" in the bottom left corner. These are the "World Coordinate Axes". However, when you put objects into this 3D space, they will also have their own individual (Local) axes tripods. Finally, notice also that max uses a colour convention; "X,Y,Z" equals "Red, Green, Blue". This is important later when we look at max animation displayed in the form of graphs in the Curve Editor; movement in the x direction will be shown as a red line, y will be a green line and z will be blue.

Time Slider, Animation Controls, Track Bar and the Curve Editor



Directly below the Viewports lies the Time Slider.



- Click and drag the Time Slider from side to side.

This is how you move forwards and backwards through the frames of your animation. Alternatively you can click on the arrowheads at either end of the slider or click on an empty section and the slider will jump to that position.

By default max gives you 100 frames to work with; equivalent to four seconds in the European Video Format known as PAL. (No, it's got nothing to do with dog food; it stands for the catchy little phrase "Phase Alternate Line". America and Japan use the NTSC format; that's the even duller "National Television Standards Committee" where 100 frames whiz by in about 3.3 seconds). max allows you to set up for various film and video frame rates, but these are only important if you intend to transfer finished animations.

- Locate and click on the Time Configuration button (it's circled in the above screenshot) to see frame rate and playback settings. (Here you can select more than 100 frames, when needed). Click on Cancel to exit from the Time Configuration Dialogue box.

Below the Time Slider is the Track Bar. This displays all the frames set under Time Configuration – so at the moment it shows 0 to 100. The current frame is highlighted by a blue rectangle.

- To the left of the Track Bar is a button to open the Mini Curve Editor. **Click** on it

The Curve Editor is really just a more detailed type of Track Bar. It displays and lets you edit the animation settings for anything in your scene. When in use, the Curve Editor will scroll to display the animation settings for whichever object you have selected in your scene.

- The Curve Editor toolbar has a large button labelled “Close”. **Click** on it to return the screen to normal.

Several buttons feature a key, either as a word or as an icon. These are the animation buttons. When animating, you “set” certain frames or “key frames” where you define an element in your animation – such as the position of an object. These buttons offer various ways of working with max to set up these key frames. You can **click** on them if you like, but nothing interesting will happen. (gmax just has one button labelled “Animate”)

The other controls are the normal tape transport symbols for Play, Rew and FF.

- Press Play

Both the Time Slider and the blue rectangle in the Track Bar run repeatedly through the 100 frames. Notice that this is quite slow since max is currently set to playback animation at the PAL standard of 25 frames per second.

View Controls

At the bottom right-hand corner of the screen are the View Controls. Some of these, such as the Zoom icons, may be familiar. The important thing to realise is that some of these buttons change with the active viewport (and also when you look through cameras and lights).

- Click between the Perspective and one of the other viewports. Notice the (slight) change to the View Controls.

Although some buttons may change, these controls are always in the same area. You will be using these a lot, so remember their position.

More tools

3D Studio MAX (as it used to be called) first appeared in 1995 having spent the previous five years running under Microsoft DOS. Over the years, more features have been added and newcomers to the program often feel that the locations of various controls are, shall we say, a bit odd. This is certainly true for the collection of various tools which have gathered together under the Track Bar. However, just because these controls do not form a neat cohesive unit does not mean they are unimportant. Far from it, and as such, each deserves a mention.

Starting on the left we have the MAXScript Mini Listener. This is divided into two panes, one pink and one white. MAXScript is 3ds max’s own programming language and most max functions have an associated programming statement.

For example;

- In the white, lower pane type **sphere radius:50** and press RETURN.

Notice that the object appears shaded in the perspective viewport, but as a wireframe in the other views. This is normal. Although you can enter commands to operate max, you'll be happy to learn that we're not going to do this. However, you should realise that it's the ability to reprogram 3D software like max and Maya (which has its own MELscript) which is the major reason these programs lead the sector.

The top Special Effects teams don't buy off-the-shelf software to create their effects. They develop their own tools – like Stephen Regelous's development of Massive for Weta Digital – and choose off-the-shelf software because it offers the programming tools to integrate their own software into a "production workflow" or "rendering pipeline". Indeed, in the professional effects world, something like 90% of the scenes built in Maya aren't rendered in Maya, but are exported to other rendering systems such as Pixar's "Renderman" or "mental ray" from mental images. Similarly, about 80% of computer games world-wide are developed using max, but are exported from max to run under various "game engines".

Animation, Effects and Game houses use tools like MAXScript to alter existing program functions and/or to develop completely new ones. They can automate certain repetitive processes which would otherwise tie up their staff for hours. For example – a freelance animator called Adam Watkins has written a MAXscript version of Massive – called Mayhem. Sadly, he has yet to market it, so in the mean time…

- Click on the **MAXScript** menu at the top of the screen and choose **Run Script**
- Select the **examples** folder
- Select the file called **Example_WALK.ms**
- Click on **Open**

My script will take about one minute to execute, so be patient. Notice that animation playback only takes place in the active viewport. Again this is normal.

- Click on the Front viewport to watch the animation play in this view

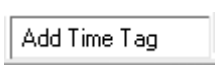
Happily, MAXScript programming is beyond the scope of these tutorials and this course.

- Leave the demo running while you read on.

Next are the **Status** and **Prompt Bars**. Although these are not as interesting as some of the other items which appear in max don't ignore them.

In order to work on any object in your scene (say, to change its colour or to delete it) the object must be *selected*. At any stage the message in the **Status Bar** informs you how many objects are selected. The **Prompt Bar** tells you what you can do at any stage.

When the system does not respond in the way you expect, read the Status and Prompt messages. There are cases when all is apparently well and yet things still go wrong. You could, for example, have more than one object selected, but only one visible, and issue a delete command thinking you were deleting only the visible one… If the Bars are too short to read the whole message, drag the left hand edge of the **Status** and **Prompt Bars** over to the left of the screen. You'll lose the MAXScript Mini Listener, but you can slide it back should you ever need it.



Just to the right of the **Prompt Bar** is the **Time Tag Bar**.

- **Click** on it and select Add Tag.

With the demo still playing, the Time Tag box will appear asking you to name the particular frame.

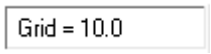
- Under Tag Name, type the words *important frame*.
- **Click** on Okay.
- **Click** on the Time Tag Bar again, followed by Add Tag
- Type *another important frame* and then Okay.
- Now stop the animation playback and **click** on the Time Tag Bar a third time.

You should notice the two labels you just typed alongside their respective frame numbers.

- Select one.

Notice that the Time Slider jumps to the appropriate frame and the Tag Name now appears in the Time Tag Bar. Time Tags are a useful way to move around an animation.

- Select Edit Tag instead of Add Tag and delete the Tags you have just created.



Above the Time Tag Bar is a display showing the current grid measurements for the viewports. This is normally set to generic units, but can be changed to any other units (eg mm, cm, m etc).

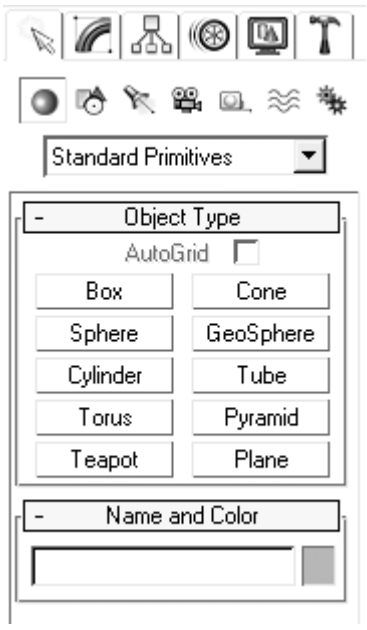
Lock Selection does exactly what it says. You can lock onto one or more objects so that you don't accidentally de-select them. The keyboard shortcut is the Space Bar. Try the following,

- Stop playback (notice that the Select Object Tool is active/highlighted on the Main Toolbar)
- Select (ie **click** on) any object in any of the viewports and lock on to it by pressing the Space Bar.
- Now try to select something else.
- Hit Space Bar to cancel the lock.

The X Y Z readouts next to the Status Bar do two important things. Firstly they are the **Coordinate Display** for the cursor as it moves over the grid in the currently active viewport (shown with the yellow border). Depending on which viewport you choose, one of these numbers will always be zero no matter where the cursor moves. Why? If you move the cursor over an inactive viewport, the displays are blank. Secondly they can act as a **Transform Type-In**, allowing you to type in numbers to position objects in your scene.

Command Panels

On the right hand side of the screen lie the six Command Panels which you use to create and modify the various objects in your scene. When in operation these panels expand to show more buttons. As with the Main Toolbar, if your screen is not large enough you can scroll the whole panel to access hidden sections.



- Find and select the Display Panel (this is the tallest panel by default).

To scroll a command panel;

- Move the cursor across the panel and when the pointer changes into a hand, drag vertically. (If your screen is too large to see this you can always use "Restore Down" to shrink the main max screen down.)

As you scroll the panel, notice that there is a very thin elevator bar down the right-hand side of the panel. This line represents the height of the whole panel. The pale grey portion represents the part of the panel which is currently visible, the dark grey section(s) represent hidden sections.

- To jump from one end of a panel to the other, simply click on the dark grey section of the elevator bar. Or you can drag the pale grey section.

Inside a command panel itself you can expand and collapse certain sections – called Rollouts. In the picture shown on the previous page there are two rollouts titled “Object Type” and “Name and Color”.

- To expand/collapse a rollout, you click on the rollout title bar. Try some in the Display Panel.

Notice that the symbol on the left-hand end of the rollout title bar toggles between a “+” and a “–”, indicating the status of the rollout.

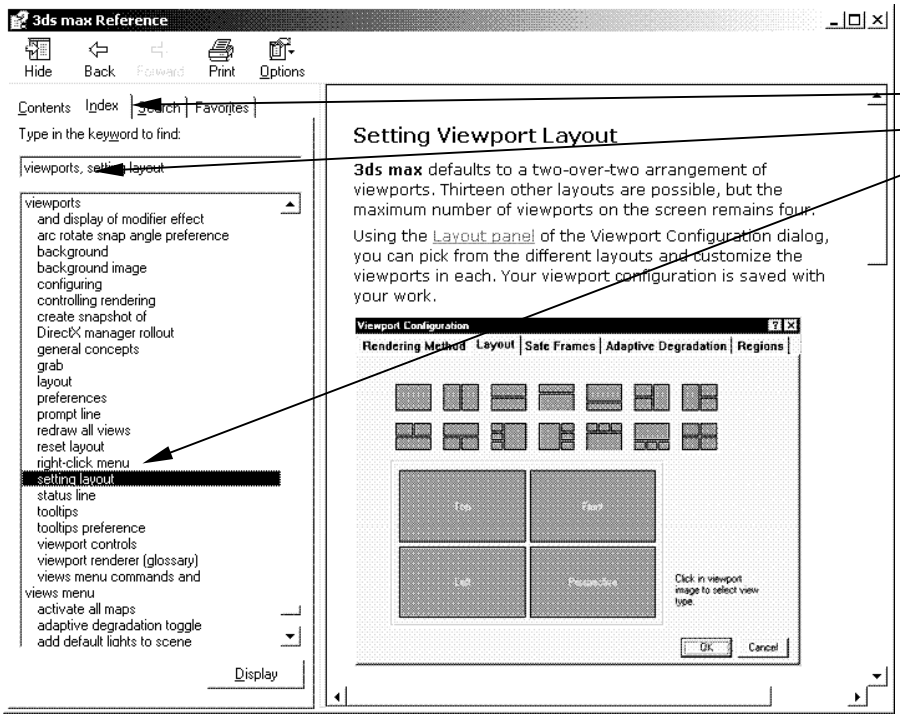
Other Important Buttons

Undo/Redo max provides 20 levels of undo by default. Most operations can be undone.

Snap Controls provide various options for moving and rotating objects by small steps.

The Help Menu

You will find explanations of max functions in these tutorials, but alternatives should not be ignored. The Help menu is another source of useful guidance and more tutorials.



- **Click** on the Help Menu. Select User Reference
- **Click** on the Index Tab.
- Type in the word viewports.
- **Click** on the words *setting layout* as shown
- Have a quick read through the information.

Now turn over the page and note down some of the main max shortcuts.

Task One – The Top 30 Shortcuts

Under the Help Menu choose Hotkey Map. Move the mouse over the image of the keyboard to cycle through the available keyboard shortcuts. Use the information shown to complete the following table.

Category	Keyboard Shortcut	User Interface Function
Animation and Time Slider	n	
	.	
	,	
	home	
	/	
View Controls	Ctrl + r	
	Click mouse wheel and move mouse	
	Scroll mouse wheel	
	z	
Viewports	Alt + w	
	f	
	L (lower case)	
	p	
	t	
	c	
	Ctrl + c	
	F3	
	F2	
Select	h	
	space	
Snap Controls	s	
Positioning objects	w	
	e	
	Alt + a	
Undo	Ctrl +z	
	Shift + z	
Save	Ctrl + s	
Render	Shift + q	
Background and Effects	8	
Materials	m	

SHOW THIS COMPLETED SHEET TO YOUR TUTOR AND KEEP IT HANDY FOR THE NEXT TUTORIALS